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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/599,523

09/29/2006

Sang Jun Youn

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EXAMINER

DUCHENEAUX, FRANK D

ART UNIT

PAPER NUMBER

1787

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/599,523	Applicant(s) YOUN ET AL.	
	Examiner FRANK D. DUCHENEAUX	Art Unit 1787	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-39 is/are pending in the application.
- 4a) Of the above claim(s) 11-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Examiner's Notes

The examiner acknowledges the cancellation of claim 6 in the amendments filed 3/31/2010.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/31/2010 has been entered.

Response to Amendment

2. Applicant's arguments, see pages 2-3 and 11-12, filed 3/31/2010, with respect to the objection to the drawings have been fully considered and are persuasive. The objection of the drawings has been withdrawn.

Claim Objections

3. **Claim 7** is objected to because of the following informalities: the examiner suggests removing the “and” immediately following “polyester” in order to conform to proper Markush language if that is what the applicants intend. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 1-5 and 7-10** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification as originally filed does not support the recitation in current claim 1 reciting the prepreg layer is “laminated on at least one whole surface of the upper surface and lower surface” and as such, said amended portion constitutes new matter.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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7. **Claims 1-5 and 7-10** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. **Claim 1** recites the limitation "the upper surface and lower surface" in line 5. There is insufficient antecedent basis for this limitation in the claim.

9. **Claim 8** recites the limitation "the reinforcing fibers" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim as it is unclear from the claim limitations whether the current limitation is intended to modify the reinforcing fibers comprising the prepreg layer (claim 1) or the reinforcing fibers comprising the center layer (claim 2).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. **Claims 1, 5, 7 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 5294394) in view of Hsiao et al. (US 2002/0009935 A1).

Regarding claim 1, 5, 7 and 10, Sakai teaches preparation of fiber-reinforced thermoplastic molded articles (title) comprising a laminate (column 9, line 47) of a plate material (center layer) essentially consisting of a thermoplastic resin and fibrous reinforcement (thermoplastic composite material), and a sheet (continuous layer) prepreg obtained by impregnating a unidirectionally (mono-directional structure) arranged fiber with a thermoplastic resin (column 5, lines 9-13), said sheet prepreg is set up on either one or both of the surfaces (upper and lower surface) of the back of the plate material to provide an extremely remarkable increase in strength (column 5, lines 49-52) and said prepreg layer having a reinforcing fiber content of 30 wt. % - and thereby 70 wt. % of a thermoplastic resin (Table 2, prepreg E and Example 8). Sakai also teaches that prescribed numbers of the sheet prepreg are stacked (outermost prepreg sheet serving as a protective layer) in an arbitrary portion on the sheet material and that the sheet material is maintained above the flow temperature (melted) of the thermoplastic resin and then placed in a mold and pressed (adhered) for a short time to carry out foaming, defoaming and cooling and that the resin in the plate material is the same as that of the prepreg; (column 5, lines 37-48). Sakai continues to teach a plate material made of a thermoplastic resin with a fibrous reinforcement of a glass fiber (glass fiber-reinforced thermoplastic resin layer) (Table 1, plate

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material (b) and Example 8). Sakai further teaches suitable thermoplastic resins for the plate material include polypropylene, polyethylene, nylon, PET and polyphenylene sulfide (column 2, lines 40-48); and those resins exemplary for the sheet prepreg include polypropylene, polyethylene, nylon, PET and polyphenylene sulfide (column 3, lines 43-50).

The examiner notes that, while Sakai is specifically silent to a continuous reinforcing fiber-impregnated prepreg layer laminated on a at least one whole surface of an upper and lower surface of a center layer, as set forth above, Sakai does teach that sheet prepreg is set up on either one or both of the surfaces of the back of the plate material to provide an extremely remarkable increase in strength. Therefore, it would have been obvious to one of ordinary skill in the art to provide the sheet prepreg layers on an entire surface of a plate material given that one of ordinary skill could easily distinguish the necessity of strengthening the whole surface or surfaces of the plate material over strengthening only a portion of a surface or surfaces of a plate material as in the present invention. Sakai is silent to a continuous reinforcing fiber-impregnated prepreg layer formed in a tape or strand shape by drawing and pressing fibers through an impregnation die supplied with a thermoplastic resin melt.

However, Hsiao teaches core-crush resistant fabric and prepreg fiber reinforced composite sandwich structures (title) comprising a fabric (10) having a plurality of openings (16) by interweaving warp tow strands (12) and weft tow strands (14) (para 0033, lines 1-3 and figures 1-4), wherein each tow strand is formed from a plurality of continuous filaments and fibers such as those made of high modulus reinforcing fibers such as carbon (natural), fiberglass and aramid

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(para 0034), and a suitable resin composition for the polymeric matrix resins such as, *inter alia*, polyester and polyamides (para 0039, lines 1-11), said resin applied to the fabric such that the fabric is substantially impregnated and having a resin content of from about 20 to about 60 percent by weight based on the total weight of the prepreg, and the prepreg can further undergo other treatment such as calendaring or compaction to reduce the openness of the prepreg (para 0053). Hsiao continues to teach that prepregs made with the interweaving tow strands greatly reduces the porosity (para 0074, lines 1-3).

Although Sakai and Hsiao do not disclose “drawing and pressing fibers passed through an impregnation die supplied with a thermoplastic resin melt,” it is noted that “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, “although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). See MPEP 2113.

Therefore, absent evidence of criticality regarding the presently claimed process and given that Sakai and Hsiao meet the requirements of the claimed continuous reinforcing fiber-impregnated prepreg layer, Sakai and Hsiao clearly meet the requirements of the present claims.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Sakai and Hsiao references toward fiber-reinforced thermoplastic molded articles having continuous reinforcing fiber-impregnated prepreg layer constructed of high modulus fibers laminated on both sides of a plate material thereby providing the composite structure with reduced porosity as in the present invention.

13. **Claims 2 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 5294394) in view of Hsiao et al. (US 2002/0009935 A1) and in further view of Funakoshi (US 2003/0161989 A1).

Regarding claims 2 and 8, Sakai and Hsiao teach the fiber-reinforced thermoplastic molded articles as in the rejection of claim 1 above. Sakai also teaches that the content of fibrous reinforcement in the plate material is from 30 to 70 % by weight and in view of reinforcing effects alone higher amounts are better, but a content exceeding 70 % by weight leads to flowability problems, while in view of flowability a content of 50 % by weight or less is preferred (column 3, lines 37-42). Sakai is silent to fibers with an average length of 1-30 mm.

However, Funakoshi teaches a lightweight fiber-reinforced thermoplastic resin molding (title) comprising fibers of an average length of 2 mm to about 10 mm (para 0040) and that tensile and bending strength tend to be greater as the length of reinforcing fibers increases (para 0039).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Sakai, Hsiao and Funakoshi references to provide a fiber-reinforced thermoplastic plate material having fibers in a percent weight as presently claimed and a length as presently claimed towards fiber-reinforced thermoplastic molded articles, wherein a plate material has an amount of fiber content sufficient to provide reinforcing characteristics while maintaining adequate flowability, said fibers additionally providing tensile and bending strengths commensurate with the application for which the articles are to be used as in the present invention.

14. **Claims 3 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 5294394) in view of Hsiao et al. (US 2002/0009935 A1) and in further view of Nagayama et al. (US 6749934).

Regarding claims 3 and 9, Sakai and Hsiao teach the fiber-reinforced thermoplastic molded articles as in the rejection of claim 1 above. Hsiao also teaches well known flow control agents, albeit added to the resins of the prepreg layer, to adjust the viscoelasticity of a resin composition such as inorganic particles (para 0041) such as, *inter alia*, calcium carbonate (para 0043). Sakai and Hsiao are silent to a center layer comprising 15 to 30 % by weight of inorganic filler.

However, Nagayama teaches an FRP molded article and method for producing the same (title), comprising a mixture of thermoplastic resin and reinforcing fibers (abstract) and a filler such as needle-like calcium carbonate (column 7, lines 43-47), wherein the needle-like filler content is 5 to 20 wt. % (column 8, lines 23-26). Nagayama also teaches a fine filler, especially a needle-like

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filler, inhibits local molding shrinkage and irregular stiffness, which mitigates warping (column 8, line 67 and column 9, lines 1-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Sakai, Hsiao and Nagayama references to provide the plate material with an inorganic filler material in an amount as presently claimed towards a fiber-reinforced thermoplastic molded article, wherein the viscosity of the resinous plate material can be controlled for processing of the fiber-reinforced thermoplastic molded article, and which is less susceptible to local shrinkage of the mold and irregular stiffness and provides a molded article with diminished warping and thereby an article with improved aesthetic appearance as in the present invention.

15. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al. (US 5294394) in view of Hsiao et al. (US 2002/0009935 A1) and in further view of Bassett et al. (EP 0945253 A2).

Regarding claim 4, Sakai and Hsiao teach the fiber-reinforced thermoplastic molded articles as in the rejection of claim 1 above. Hsiao also teaches well known flow control agents, albeit added to the resins of the prepreg layer, to adjust the viscoelasticity of a resin composition such as organic particles (para 0041) such as, *inter alia*, cellulose (para 0043). Sakai and Hsiao are silent to a center layer comprising 20-40 % by weight of wood flour and chaff.

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However, Bassett teaches a filled composite material (title) comprising a polyolefin, glass fibers and filler (abstract), wherein said filler is a wood flour (para 0019, lines 1-2) with a content of 20 to about 40 % by weight of the composite (para 0036, line 3). Bassett also teaches that wood flour can be used for cost reduction of the composite materials.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Sakai, Hsiao and Bassett references to provide the plate material with an organic filler material in an amount as presently claimed towards a fiber-reinforced thermoplastic molded article, wherein the viscosity of the resinous plate material can be controlled for processing of the fiber-reinforced thermoplastic molded article, and which is less expensive to produce as in the present invention.

Response to Arguments

16. Applicants' arguments, see pages 12-14, filed 3/31/2010, with respect to the rejection of claims 1, 5-7 and 10 over Sakai et al. in view of Hsiao et al. under 35 U.S.C. 103(a); the rejection of claims 2 and 8 over Sakai et al. in view of Hsiao et al. and in further view of Funakoshi under 35 U.S.C. 103(a); the rejection of claims 3 and 9 over Sakai et al. in view of Hsiao et al. and in further view of Nagayama et al. under 35 U.S.C. 103(a); and the rejection of claim 4 over Sakai et al. in view of Hsiao et al. and in further view of Bassett et al. under 35 U.S.C. 103(a) have been fully considered but they are not persuasive. The examiner's complete response follows.

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The applicants argue that the Sakai reference teaches that it is unfavorable to prepare the whole molded article with such resin and fibrous reinforcement (column 1, lines 59-63) and further teaches that Sakai intends to have for a prepreg on only a portion of a plate material (column 5, lines 15-36). On page 14 of the current response, the applicants have acknowledged the inclusion of the “whole” limitation into the amended claim 1 to lend support to the current arguments.

The examiner respectfully disagrees with the applicant's characterization of those portions of the Sakai reference in column 1, lines 59-63 in that said portions of the reference are contained within the background and are not a part of the referenced invention. In addition, it is also noted that the “unfavorable” aspects of which Sakai teaches is directed to prior materials used to solve similar problems, said prior materials being unfavorable in terms of cost. The examiner notes that those portions of the Sakai reference to which the applicants have referred (column 5, lines 15-36) were not included in the prior art rejections of the previous action and the process referred to in this portion of the disclosure is one of the processes disclosed by Sakai and is therefore not required; the applicants' attention is directed to an alternative process as disclosed by Sakai, for example, column 5, lines 37-42, wherein Sakai merely discloses that the prepreg is located where the molded article is liable to deform, which could clearly be an entire surface of an upper and/or lower surface of a molded article and such a distinction would have been obvious to one of ordinary skill in the art.

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The applicants also argue that the combination of the Sakai and Hsiao reference is improper given that the Hsiao reference is directed towards prepregs that encompass a honeycomb core with the intention of preventing core-crush, and that a combination of the Sakai and Hsiao references would require substantial reconstruction of both references as well as a change in the basic principle of one reference with respect to the other.

The examiner notes that both the Sakai and Hsiao reference are directed to inventions wherein, the substance of the invention revolves around impregnation of fiber reinforced prepregs and as such, there is proper motivation to combine the references. In addition, it is noted that, while Hsiao et al. does not disclose all the features of the present claimed invention, Hsiao is used as teaching reference, and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed invention, *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973), *In re Keller* 624 F.2d 413, 208 USPQ 871, 881 (CCPA 1981). Rather this reference teaches a certain concept, namely a resin impregnated fabric, wherein the fabric comprises continuous filaments and fibers interwoven into strands for reducing porosity, and in combination with the primary reference, discloses the presently claimed invention.

Further, it is noted that the "test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference... Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art", *In re Keller*, 642 F.2d 413, 208 USPQ 871, 881 (CCPA 1981) and that

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"combining the teachings of references does not involve an ability to combine their specific structures", In re Nievelt, 482 F.2d 965, 179 USP 224, 226 (CCPA).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANK D. DUCHENEAUX whose telephone number is (571)270-7053. The examiner can normally be reached on M-Th, 7:30 A.M. - 5:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie E. Shosho can be reached on (571)272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/FRANK D DUCHENEAUX/
Examiner, Art Unit 1787

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1787

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